Technical Report 63

A SHIELDING DEVICE FOR X-RAY DIFFRACTION CAMERAS

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The most common type of device used for preventing the scattering of X rays between the window of an X-ray tube and the collimator of the camera, is a slotted piece of lead sheet cupped around the tube. An arrangement of this nature suffers from the disadvantage of nonrigidity, so that after each replacement on the camera the efficiency of the shield is altered. It was observed in this laboratory that the intensity of the scattered radiation from such shields was often as much as 80 to 100 mr per hour.

A simple device of durable construction is presented which completely prevents this undesirable scattering, an unbroken connection being made between the X-ray tube and the camera. This consists of two short brass semi-

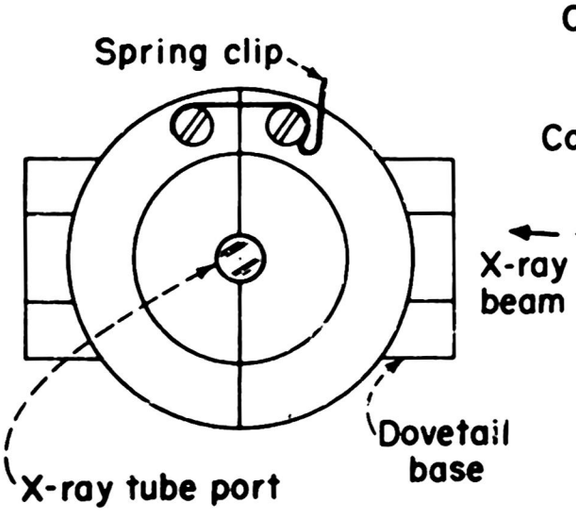

Fig. 1. Front view of shield.

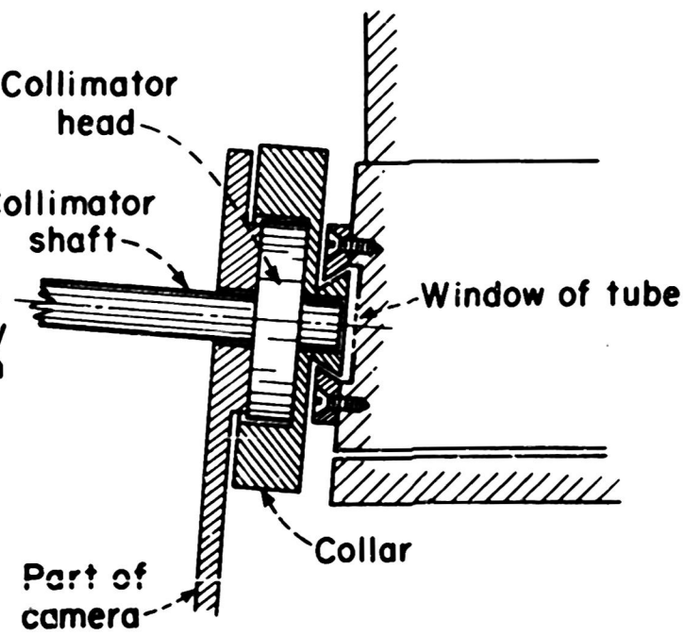

Fig. 2. Side section of shield with collimator in place.

cylindrical collars which closely fit the circular head of the collimator. Along the axis of each half collar is a smaller semicylindrical space which just accomodates the shaft of the collimator (Figs. 1 and 2). The shield is provided with a dovetail base that mates with a runway screwed onto the X-ray tube. This permits a sliding motion which facilitates centering with respect to the X-ray tube port. The runway may be constructed in one piece to provide easy adjustment normal to the sliding direction. Space is left between the runway and the tube for the insertion of a filter mounted on a lead strip. When the port is not in use, the filter strip may be replaced by a solid lead strip.

Although this device was designed for Machlett X-ray tubes and Supper collimaters and cameras, it may easily be modified for most other types of tubes and cameras.